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U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
WASHINGTON 25, D.C.

Letter
Circular
LC874
(Supersedes
LC781)

August 22, 1947

RADIO:

Publications by the Staff of the National Bureau of Standards.

Contents

(over)

General Information

Some of the publications in this list have appeared in the regular series of publications of the Bureau, and others in various scientific and technical journals. Unless specifically stated, papers are not obtainable directly from the National Bureau of Standards.

Where the price is stated, the publications can be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Remittances should accompany order and should be made either by coupons, obtainable from the Superintendent of Documents in sets of 20 for $1.00 and good until used, or by check or money order payable to him. The prices in this Letter Circular are for delivery by mail to addresses in the United States and its possessions and in certain foreign countries that extend the franking privilege. In the case of all other countries, one-third the cost of the publication should be added to cover postage.

Publications marked "Free" are mimeographed pamphlets obtainable from the National Bureau of Standards without charge.

Publications marked "OP" are out of print, but, in general, may be consulted at technical and public libraries.

For papers in outside scientific or technical journals, the name of the journal or the organization publishing the article is given in abbreviated form, with the volume number (underscored), page, and year of publication, in the order named. The Bureau can not supply copies of these journals, or reprints from them, and it is unable to furnish information as to their availability or price. They, too, can usually be consulted at technical libraries. Inquiries for copies of such papers should be addressed directly to the publisher of the journal at the address given in list below.

This list includes all publications since Jan. 1, 1924, and also the publications earlier than 1924 issued by the Bureau, of which copies are still available.

The Bureau does not maintain a mailing list for distribution of its radio publications as issued. Persons who wish to keep in touch with the Bureau's radio publications should subscribe to the "Technical News Bulletin", a monthly pamphlet giving news on the Bureau's scientific and engineering work and announcements of all new publications. Subscriptions should be sent to Superintendent of Documents, Government Printing Office, Washington 25, D.C. The price is $1.00 a year for subscribers in the United States.

The monthly Journal of Research of the National Bureau of Standards contains the Bureau's Research Papers on all subjects.

Subscriptions should be sent to Superintendent of Documents, Government Printing Office, Washington 25, D.C. The price is $4.50 a year for subscribers in U.S.A.

All publications of the Bureau on all subjects, including those which are out of print, are listed in Circular C24, "Publications of the National Bureau of Standards," and the supplements thereto. The Circular and the set of supplements can be purchased for $1.30, from the Superintendent of Documents. Copies may be consulted at technical and public libraries in the larger cities.

Series letters with serial numbers are used to designate Bureau publications:

S = "Scientific Paper". S1 to S329 are "Reprints" from the "Bulletin of the Bureau of Standards." S330 to S572 were published as "Scientific Papers of the Bureau of Standards". This series was superseded by the "Bureau of Standards Journal of Research" in 1928.

T = "Technologic Paper". T1 to T370. This series superseded by "Bureau of Standards Journal of Research" in 1928.

RP = "Research Paper". These are reprints of articles appearing in the "Bureau of Standards Journal of Research" and in the "Journal of Research of the National Bureau of Standards", the latter being the title of this periodical since July 1934 (Volume 13, number 1).

C = "Circular".

H = "Handbook".

M = "Miscellaneous Publication".

LC = "Letter Circular", a mimeographed pamphlet obtainable from the National Bureau of Standards without charge.

The underlined topics used as center-headings below are not the names of publications; they are general subjects given merely for convenience of classification of the various publications. The numbers under these topics are classification numbers according to the decimal classification system, and are not numbers by which any publications are known or ordered. A complete description of the classification system is given in Letter Circular No. 814 "Revised Classification of Radio Subjects used in the NBS (Jan. 11, 1947).

Addresses of Publishers of Journals

Aeronautical World, 1709 W. 8th St., Los Angeles, Calif.
The American Yearbook, The MacMillan Co., New York City.
Annals of the American Academy of Political and Social Science, 3457 Walnut St., Philadelphia, Pa.
Bulletin of the National Research Council, National Academy of Sciences, Washington, D.C.
Bulletin of the American Meteorological Society, Blue Hills Observatory, Harvard University, Milton, Mass.
Electrical World, 330 W. 42nd St., New York City.
Electronics, McGraw-Hill Bldg., 330 W. 42nd St., New York City.
The Engineering Foundation, 29 West 39th St., New York City.
Engineers and Engineering, 124 W. Polk St., Chicago, Ill.
Horological Institute of America, 421 State Life Bldg., Indianapolis 4, Ind.
Jahrbuch d. drahtlosen Telegraphie, M. Krayn, Genthiner Strasse, 32, Berlin, Germany.
Journal of the Aeronautical Sciences, 5341 RCA Bldg., Rockefeller Center, New York City.
Journal of the Franklin Institute, Franklin Institute of the State of Pennsylvania, Philadelphia, Pa.
Journal of the Optical Society of America and Review of Scientific Instruments, American Institute of Physics, 11 E. 38th Street, New York City.
Journal of the Washington Academy of Sciences, Washington Academy of Sciences, Washington, D.C.
Journal of the Western Society of Engineers, 205 W. Wacker Drive, Chicago, Ill.
Mechanical Engineering, 29 W. 39th Street, New York City.
National Aeronautical Association Review, 1909 Mass. Ave., N.W., Washington, D.C.
Nature, MacMillan Co. Ltd., St. Martin Street, London, W.C. 2, England.
L'Onde Electrique, La Societe des Amis de la TSF, Paris, France.
Papers of the General Assembly held in Washington, International Scientific Radio Union; International Scientific Radio Union, Brussels, Belgium.
Papers of the International Civil Aeronautics Conference, Supt. of Documents, Government Printing Office, Washington, D.C.
Papers of the Seventeenth Annual Safety Congress, National Safety Council, Chicago, Ill.
Physical Review, American Institute of Physics, 11 E. 38th St., New York City.
Proceedings of the Institute of Radio Engineers, 1 E. 79th Street, New York City.
Proceedings of the National Academy of Sciences, National Academy of Sciences, Washington, D.C.
Proceedings of the Third Pan-Pacific Science Congress, National Research Council of Japan, Tokyo, Japan.
QST, American Radio Relay League, W. Hartford, Conn.

Radio, 342 Madison Ave., New York City.
Radio Engineering, Bryant Publishing Co., 19 E. 47th St., New York City.
Radio News, Ziff-Davis Pub. Co., 608 S. Dearborn St., Chicago, Ill.
Science, The Science Press, Grand Central Terminal, New York City.
Scientific American, 24 West 40th Street, New York City.
Terrestrial Magnetism & Atmospheric Electricity, Johns Hopkins Press, Baltimore, Md.
Trans. Amer. Geophysical Union, 12th Ann. Meeting, National Academy of Sciences, Washington, D.C.

Radio (General)
(R000)

Title	Series	Price
The principles underlying radio communication. 2nd ed., 1922. Signal Corps Radio Communication Pamphlet No. 40. (Textbook, 619 pages, with 300 illustrations, covering radio principles and practice).		$1.00
Electrical interference with radio reception. (1945).	LC784	Free
Revised classification of radio subjects used in the NBS (1947).	LC814	Free
Sources of radio information. (1947).	LC850	Free

Radio communication, review for year. J. H. Dellinger. The American Yearbook, 1925, 1926, 1927, 1928, 1929.

Laws: Regulations
(R007)

Engineering aspects of the work of the Federal Radio Commission. J. H. Dellinger. Proc. I.R.E. 17, 1326-1333 (1929).

Radio broadcasting regulation and legislation. J.H. Dellinger. Proc. I.R.E. 17, 2006-2010 (1929).

Radio Research
(R010)

Survey of current progress in radio engineering. J.H. Dellinger. J. Western Soc. Engineers 30, 39-49 (1925).

The International Union of Scientific Radio Telegraphy. J. H. Dellinger. Science 64, 638-639 (1926).

The International Union of Scientific Radio Telegraphy. J. H. Dellinger. Proc. I.R.E. 16, 1107-1112 (1928).

Some contributions of radio to other sciences. J. H. Dellinger, J. Franklin Institute 228, 11-42 (1939).

Radio Wave Transmission Phenomena (General) (R113)

Title	Series	Price
A statistical study of conditions affecting the distance range of radio telephone broadcasting stations. C. M. Jansky, Jr. Tech. Pap. BS 19 641-650 (1925).	T297	OP
Some studies of radio transmission over long paths made on the Byrd Antarctic Expedition. L. V. Berkner. BS J. Research 8, 265-272 (1932)	RP412	10¢
Bi-monthly reports, Receiving measurements and atmospheric disturbances at the Bureau of Standards. L.W. Austin. Proc.I.R.E. 10, 239, 315, 421 (1922); 11, 3, 83, 187, 333, 579 (1923); 12, 3, 113, 227, (1924).		
Field intensity measurements in Washington on the Radio Corporation stations at New Brunswick and Tuckerton, N.J. L.W. Austin. Proc. I.R.E. 12, 681-692 (1924).		
Some transpacific radio field intensity measurements. L.W. Austin Proc.I.R.E. 13, 151-157 (1925). J. Washington Acad. Sciences 15, 139-143 (1925).		
Facts and fallacies of radio wave transmission. J.H. Dellinger. Radio News, 7, 1139, 1192, 1194 (1926).		
Application of radio transmission phenomena to the problems of atmospheric electricity. J.H. Dellinger. J. Wash. Acad. Sciences 16, 162-167 (1926).		
Apparatus for recording radio phenomena. T. Parkinson. Bul. Nat. Research Council, No. 61, 183-191 (1927).		

Title	Series	Price

Summary of symposium on correlations of various radio phenomena with solar and terrestrial magnetic and electric activities. J. H. Dellinger. Bul. Nat. Research Council, No. 61, 192-197 (1927).

Report of the Chairman of the Commission of Radio Wave Propagation. International Union of Scientific Radio Telegraphy. L. W. Austin. Proc.I.R.E. 16, 348-358 (1928).

Bibliography on radio wave phenomena and measurement of radio field intensity. Proc.I.R.E. 19, 1034-1089 (1931).

Note on reception of radio broadcast stations at distances exceeding 12,000 km. L. V. Berkner. Proc. I.R.E. 20, 1324-1327 (1932).

Report of Committee on Radio Wave Propagation. J. H. Dellinger (co-author). Proc. I.R.E. 26, 1193-1234 (1938).

Report of Commission II - Radio wave propagation, International Scientific Radio Union. J. H. Dellinger. Proc. I.R.E. 27, 645-649 (1939).

The role of the ionosphere in radio wave propagation. J. H. Dellinger, AIEE Trans. 58, 803-822 (1939).

Radio progress during 1938 - Wave propagation. J. H. Dellinger. (Co-author). Proc. I.R.E. 27, 180-183 (1939).

Radio progress during 1939 - Wave propagation. J. H. Dellinger. (Co-author). Proc. I.R.E. 28, 108-112 (1940).

A radio transmission anomaly; cooperative observations between the U.S.A. and Argentina. J. H. Dellinger and A. T. Cosentino. Proc. I.R.E. 28, 431 (1940). Also (in Spanish), Revista Telegrafica 29, 633. (1940).

Radio progress during 1940. - Radio wave propagation. J. H. Dellinger. (Co-author). Proc. I.R.E. 29, 103 (1941).

Radio progress during 1941. - Radio wave propagation. J. H. Dellinger (Co-author). Proc. I.R.E. 30, 68-69 (1942).

Fading
(R113.1)

Cooperative measurements of radio fading in 1925. J. H. Dellinger, C. B. Jolliffe, and T. Parkinson. Sci. Pap. BS 22, 419-449 (1927). S561 OP

Fading (continued)

Title	Series	Price
Some observations of short-period radio fading. T. Parkinson. BS J. Research 2, 1057-1075 (1929) Also published in Proc.I.R.E. 17, 1042-1061 (1929).	RP70	OP
A radio method for synchronizing recording apparatus. T. Parkinson and T. R. Gilliland. BS J. Research 6, 195-198 (1931). Also published in Proc.I.R.E. 19, 335-340 (1931).	RP269	OP

Radio signal fading phenomena. J. H. Dellinger and L. E. Whittemore. J. Wash. Acad. Sciences 2, 245-259 (1921). Jahrbuch d. drahtlosen Telegraphie 24, 66-70 (1924).

Concerning the nature of fading. J. H. Dellinger. Radio News 7, 270, 390 (1925).

Results of cooperative measurements of radio fading. J. H. Dellinger, C. B. Jolliffe, and T. Parkinson. Radio News 8, 146 (1926).

Daily and Seasonal Variations (R113.2)

Long-distance radio receiving measurements at the Bureau of Standards in 1923. L. W. Austin. Proc.I.R.E. 12, 389-394 (1924).

Long-distance receiving measurements in 1924. L. W. Austin. Proc.I.R.E. 13, 283-290 (1925). J. Wash. Acad. Sciences 15, 227-234 (1925).

Long-distance radio receiving measurements and atmospheric disturbances at the Bureau of Standards in 1925. L. W. Austin, Proc.I.R.E. 14, 663-673 (1926).

Long wave radio measurements at the Bureau of Standards in 1926, with some comparisons of solar activity and radio phenomena. L. W. Austin. Proc.I.R.E. 15, 825-836 (1927).

Long wave radio receiving measurements at the Bureau of Standards in 1927. L. W. Austin. Proc.I.R.E. 16, 1252-1257 (1928).

Long wave radio receiving measurements at the Bureau of Standards in 1928. L. W. Austin. Proc.I.R.E. 18, 101-105 (1930).

Daily and Seasonal Variations (continued)
(R113.2)

Title	Series	Price

Long wave radio receiving measurements at the Bureau of Standards in 1929. L. W. Austin. Proc.I.R.E. 18, 1481-1487 (1930).

Long wave radio receiving measurements at the Bureau of Standards in 1930. L. W. Austin. Proc.I.R.E. 19, 1767-1772 (1931).

A method of representing radio propagation conditions. L. W. Austin. Proc.I.R.E. 19, 1615-1617 (1931).

Tables of North Atlantic radio transmission conditions for long wave length daylight signals for the years 1922 to 1930. L.W. Austin. Proc. I.R.E. 20, 689-698 (1932).

Low-frequency radio receiving measurements at the Bureau of Standards in 1931 and 1932. E. B. Judson. Proc.I.R.E. 21, 1354-1363 (1933).

Directional Variations of Radio Waves
(R113.3)

A suggestion for experiments on apparent radio direction variations. L. W. Austin. Proc.I.R.E. 13, 3-4 (1925).

A new phenomenon in sunset radio direction variations. L. W. Austin. J. Wash. Acad. Sciences 15, No. 14, 317-319 (1925). Proc.I.R.E. 13, 409-412 (1925).

Apparent night variations with crossed-coil radio beacons. H. Pratt. Proc.I.R.E. 16, 652-657 (1928).

Solar and Cosmic Effects on Radio Wave Propagation
(R113.4)

Comparison of data on the ionosphere, sunspots and terrestrial magnetism. E.P. Judson. J.Research NBS 17, 323-330 (1936). Also published in Proc.I.R.E. 25, 38-46 (1937). — RP913 — OP

Sudden disturbances of the ionosphere. J. H. Dellinger. Research NBS 19, 111-149 (1937). Also published in Proc. I.R.E. 25, 1253-1290 (1937). — RP1016 — OP

Measurements of ultraviolet solar- and sky-radiation intensities in high latitudes. W.W.Coblentz, F.R. Gracely, and R. Stair. J.Research NBS 28, 581-591 (1942). — RP1469 — 10c

Solar and Cosmic Effects on Radio Wave Propagation (continued) (R113.4)

Radio signal strength and temperature. L.W. Austin and I.J. Wymore. Proc.I.R.E. 14, 781-784 (1926).

The relations between radio and other natural phenomena. L. W. Austin. Proc. of the Third Pan-Pacific Science Congress 2, 1257-1263 (1926).

On the influence of solar activity on radio transmission. L. W. Austin and I. J. Wymore. Proc.I.R.E. 16, 166-173 (1928).

The relation of radio propagation to disturbances in terrestrial magnetism. I. J. Wymore. Proc.I.R.E. 17, 1206-1213 (1929).

Note on a comparison of sunspot numbers, terrestrial magnetic activity, and long wave radio signal strength. L. W. Austin. J. Wash. Acad. Sciences 20, 73-74 (1930).

Solar and magnetic activity and radio transmissions. L. W. Austin, E. B. Judson, and I. J. Wymore-Shiel. Proc. I.R.E. 18, 1997-2002 (1930).

Solar activity and radiotelegraphy. L. W. Austin. Proc.I.R.E. 20, 280-285 (1932).

Observations on long-delay radio echoes. J. H. Dellinger. QST 18, pp. 42, 88 of August (1934).

The ionosphere, sunspots and magnetic storms. S. S. Kirby, T. R. Gilliland, E. B. Judson, and N. Smith. Phys. Rev. 48, 849 (1935).

A new cosmic phenomenon. J. H. Dellinger. Science 82, 351 (1935).

A new radio transmission phenomenon. J. H. Dellinger. Phys.Rev. 48, 705 (1935).

A new radio transmission phenomena. J. H. Dellinger. QST 19, pp. 21, 29 of Dec. 1935.

Confirmation of cosmic phenomenon. J. H. Dellinger. Science 82, 548-549 (1935).

The ionosphere, solar eclipses, and magnetic storms. S. S. Kirby, T. R. Gilliland, N. Smith, and S. E. Reymer. Phys. Rev. 50, 258-259 (1936).

Solar and Cosmic Effects on Radio Wave Propagation (continued)
(R113.4)

A new solar radio disturbance. J. H. Dellinger. Electronics 9, pp. 25,. 34 of Jan. (1936).

New Cosmic phenomena. J. H. Dellinger. QST 20, pp. 8, 79 of Jan. (1936).

High-frequency fadeouts continue. J. H. Dellinger. QST 20, p. 37 of June (1936).

Direct effects of particular solar eruptions on terrestrial phenomena. J. H. Dellinger. Phys. Rev. 50, 1189 (1936).

Ionosphere and magnetic storms. S. S. Kirby, N. Smith, T. R. Gilliland, and S. E. Reymer. Phys. Rev. 51, 992-993 (1937).

Radio fadeouts through 1936. J. H. Dellinger. QST 21, p. 35, 86, 88 of Feb. (1937).

Sudden ionospheric disturbances. J. H. Dellinger. Ter. Mag. & Atmospheric Elec. 42, 49-53 (1937).

Sudden disturbances of the ionosphere. J. H. Dellinger, J. Applied Physics 8, 732 (1937).

Remark on S. Chapman's "Note on radio fadeouts and the associated magnetic disturbances". S. S. Kirby. Ter. Mag. & Atmos. Elec. 42, 420 (1937).

Discussion of S. Chapman's "Note on radio fadeouts and associated magnetic disturbances". J. H. Dellinger. Ter. Mag. & Atmos. Elec. 43, 179 (1938).

The nature of the ionosphere storm. S. S. Kirby, N. Smith, T. R. Gilliland. Phys. Rev. 54, 234 (1938).

The sun and the ionosphere. J. H. Dellinger. Fifth Report of Commission on Solar and Terrestrial Relationships, p. 72 (1939).

Radar observations during meteor showers 9 Oct. 1946. R. Bateman, A. G. McNish. V. C. Pineo. Science, 104, 434, Nov. 8, 1946.

Eclipses
(R113.412)

Title	Series	Price
Radio observations of the Bureau of Standards during the solar eclipse of August 31, 1932. S. S. Kirby, L. V. Berkner, T. R. Gilliland, and K. A. Norton. BS J. Research 11, 829-845 (1933). Also published in Proc.I.R.E. 22, 247-264 (1934).	RP629	OP
Ionosphere studies during partial solar eclipse of Feb. 3, 1935. S. S. Kirby, T. R. Gilliland, and E. B. Judson. J. Research NBS 16, 213-225 (1936). Also published in Proc.I.R.E. 24, 1027-1040 (1936).	RP868	5c
Predictions of normal radio critical frequencies related to solar eclipses in 1940. N. Smith. J. Research NBS 24, 225-228 (1940).	RP1279	5c
Observations radio telegraphiques pendant l'eclipse du soleil du 10 Septembre, 1923. (Radio observations during the eclipse of the sun, Sept. 10, 1923). L. W. Austin. L'Onde Electrique 3, 591-594 (1924).		
Radio observations of the ionosphere (at the 1940 solar eclipse in Brazil). T. R. Gilliland. Monograph of the National Geographic Society, Solar Eclipse Series, No. 2, 1942.		

Ionosphere
(R113.6)

Kennelly-Heaviside layer height observations for 4045 and 8650 kc. T. R. Gilliland. BS J. Research 5, 1057-1061 (1930). Also published in Proc.I.R.E. 19, 114-119 (1931).	RP246	10c
Preliminary note on an automatic recorder giving a continuous height record of the Kennelly-Heaviside layer. T.R. Gilliland and G. W. Kenrick. BS J. Research 7, 783-790 (1931). Also published in Proc.I.R.E. 20, 540-547 (1932).	RP373	10c

Ionosphere - continued
(R113.6)

Title	Series	Price
Investigations of Kennelly-Heaviside layer heights for frequencies between 1600 and 8650 kc per second. T.R. Gilliland, G.W. Kenrick, and K.A. Norton. BS J. Research 7, 1083-1104 (1931). Also published in Proc.I.R.E. 20, 286-309 (1932).	RP390	10c
Continuous measurements of the virtual heights of the ionosphere. T. R. Gilliland. BS J. Research 11 141-146 (1933). Also published in Proc.I.R.E. 21, 1463-1475 (1933).	RP582	OP
Note on a multifrequency automatic recorder of ionosphere heights. T. R. Gilliland. BS J. Research 11, 561-566 (1933). Also published in Proc.I.R.E. 22, 236-246 (1934).	RP608	OP
Studies of the ionosphere and their application to radio transmission. S. S. Kirby, L. V. Berkner, and D. M. Stuart. BS J. Research, 12, 15-51 (1934). Also published in Proc.I.R.E. 22, 481-521 (1934).	RP632	OP
Multifrequency ionosphere recording and its significance. T. R. Gilliland. J. Research NBS 14, 283-303 (1935). Also published in Proc.I.R.E. 23, 1076-1101 (1935).	RP769	OP
Recent studies of the ionosphere. S. S. Kirby and E. B. Judson. J. Research NBS 14, 469-486 (1935). Also published in Proc.I.R.E. 23, 733-751 (1935).	RP780	OP
Characteristics of the ionosphere and their application to radio transmission. T. R. Gilliland, S. S. Kirby, S. E. Reymer and N. Smith. J. Research NBS 18, 645-667 (1937). Also published in Proc.I.R.E. 25, 823-840 (1937).	RP1001	10c
Maximum usable frequencies for radio sky-wave transmission, 1933 to 1937. T. R. Gilliland, S. S. Kirby, N. Smith, and S. E. Reymer. J. Research NBS 20, 627-639 (1938). Also published in Proc.I.R.E. 26, 1347-1350 (1938).	RP1096	OP
Application of vertical-incidence ionosphere measurements to oblique-incidence radio transmissions. N. Smith. J. Research NBS 20, 683-705 (1938).	RP1100	OP

Ionosphere - continued
(R113.6)

Title	Series	Price
Trends of characteristics of the ionosphere for half a sunspot cycle. N. Smith, T. R. Gilliland, and S. S. Kirby. J. Research NBS 21, 835-845 (1938).	RP1159	5c
Recombination and electron attachment in the F layers of the ionosphere. F. L. Mohler. J. Research NBS 25, 507-518 (1940). Also published in Physical.Rev. 57, 1071 of June 1, 1940.	RP1342	5c
Radio transmission and the ionosphere. (1940). Earlier edition republished in QST 24, p. 32 of March (1940); and in T. & R. Bulletin 16, 405; 28; 34-35; 69-70 (1940).		OP
Oblique-incidence radio transmission and the Lorentz polarization term. N. Smith. J. Research NBS 26, 105-116 (1941).	RP1363	5c
Field equipment for ionosphere measurements. T. R. Gilliland and A. S. Taylor. J. Research NBS 26, 377-384 (1941).	RP1384	15c
Kenelly-Heaviside layer studies. P. A. DeMars, T. R. Gilliland, and G. W. Kenrick. Proc.I.R.E. 20, 106-113 (1931).		
Ionospheric investigations. T. R. Gilliland. Nature (London), 134, 379 (1934).		
Averages of critical frequencies and virtual heights of the ionosphere observed by the National Bureau of Standards, Washington, D.C., 1934-1936. T. R. Gilliland, S. S. Kirby, N. Smith, and S. E. Reymer. Ter. Mag. & Atmos. Elec. 41, 379-388 (1936).		
Averages of critical frequencies and virtual heights of the ionosphere observed by the National Bureau of Standards, Washington, D. C. Published quarterly in Ter. Mag. & Atmos. Elec., March 1937 to March 1942.		
Critical frequencies of low ionosphere layers. N. Smith and S. S. Kirby. Phys. Rev. 51, 890-891 (1937).		

Ionosphere - continued
(R113.6)

Title	Series	Price
Characteristics of the ionosphere at Washington, D.C., Jan. to May 1937. T. R. Gilliland, S. S. Kirby, N. Smith, and S. E. Reymer. Proc.I.R.E. 25, 1174-1184 (1937).		
High-frequency radio transmission conditions, with predictions for _____. Published each month in Proc.I.R.E., September 1937 to Dec. 1941.		
Predicted distance ranges for amateur radio communication. Published quarterly in QST from September 1940 to January 1942.		

Transmission Formulas; Distance Range
(R113.7. See also R113, R120)

Radio field intensity measurements at frequencies from 285 to 5400 kilocycles per second. S. S. Kirby and K. A. Norton. BS J. Research 8, 463-479 (1932). Also published in Proc.I.R.E. 20, 841-862 (1932).	RP429	OP
An analysis of continuous records of field intensity at broadcast frequencies. K. A. Norton, S. S. Kirby, and G. H. Lester. J. Research NBS 13, 897-910 (1934). Also published in Proc.I.R.E. 23, 1183-1200 (1935).	RP752	OP
Extension of normal-incidence ionosphere measurements to oblique-incidence radio transmission. N. Smith. J. Research NBS 19, 89-94 (1937).	RP1013	5c
Application of graphs of maximum usable frequencies to communication problems. N. Smith, S. S. Kirby T. R. Gilliland. J. Research NBS 22, 81-92 (1939).	R1167	OP
Preliminary note on proposed changes in the constants of the Austin-Cohen transmission formula. L. W. Austin. Proc. I.R.E. 14, 377-380 (1926).		
Propagation of waves of 150 to 2000 kilocycles per second (2000 to 150 meters) at distances between 50 and 2000 kilometers. B. van der Pol, T. L. Eckersley, J. H. Dellinger and P. LeCorbeiller. Proc.I.R.E. 21, 996-1001 (1933).		

Transmission Formulas; Distance Range - continued

Title	Series	Price
Report of Committee on Radio Propagation Data. J. H. Dellinger, S. S. Kirby, and others. Proc.I.R.E. 21, 1419-1438 (1933).		
Skip distance calculation. N. Smith. QST 21, 47-48 of May (1937).		
The relation of radio sky-wave transmission to ionosphere measurements. N. Smith. Proc.I.R.E. 27, 332-347 (1939).		

Atmospheric Disturbances; Strays
(R114)

Our present knowledge concerning the atmospheric disturbances of radio telegraphy. L. W. Austin, Bul. Nat. Research Council, No. 41, 127-130 (1924).		
The present status of radio atmospheric disturbances. L. W. Austin. Proc.I.R.E. 14, 133-138 (1926).		
Direction determinations of atmospheric disturbances on the Isthmus of Panama. L. W. Austin. Proc.I.R.E. 14, 373-376 (1926).		
Radio atmospheric disturbances and solar activity. L. W. Austin. Proc.I.R.E. 15, 837-842 (1927).		

Antennas (General)
(R120. See also R325 and R525).

Methods, formulas and tables for the calculation of antenna capacity. F. W. Grover. Sci. Pap. BS 22, 569-629 (1928).	S568	OP
Graphical determination of polar pattern of directional antenna systems. G. L. Davies and W. H. Orton. BS J. Research 8, 555-569 (1932).	RP435	OP
Radio field intensity and distance characteristics of a high vertical broadcast antenna. S. S. Kirby. J. Research NBS 16, 289-300 (1936).	RP874	5c
The possibilities of directional radio transmission. J. H. Dellinger. J. Franklin Institute 204, 239-243 (1927).		

Radio Measurements and Standardization (General)
(R200)

Radio instruments and measurements. 2nd ed. (1924, reprinted 1937).	C74	.75¢

Frequency Measurements and Standards (General)
(R210. See also R555)

Title	Series	Price
Primary radio-frequency standardization by use of the cathode-ray oscillograph. Grace Hazen and Frieda Kenyon. Sci. Pap. BS 19, 445-461 (1924).	S489	OP
Theory of determination of ultra-radio frequencies by standing waves on wires. A. Hund. Sci. Pap. BS 19, 487-540 (1924).	S491	OP
An improved type of wavemeter resonance indicator. M. S. Strock. Sci. Pap. BS 20, 111-118 (1925).	S502	OP
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A precise and rapid method of measuring frequencies from 5 to 200 cycles per second. N. P. Case. BS J. Research 5, 237-242 (1930). Also published in Proc.I.R.E. 18, 1586-1592 (1930).	RP195	OP
Accurate method of measuring transmitted wave frequencies at 5000 and 20,000 kilocycles per second. E. L. Hall, BS J. Research 5, 647-652 (1930). Also published in Proc.I.R.E. 19, 35-41(1931).	RP220	OP
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Title	Series	Price
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A system for frequency measurements based on a single frequency. E. L. Hall. Proc.I.R.E. 17, 272-282 (1929).		
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(R214)

Title	Series	Price
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New piezo oscillations with quartz cylinders cut along the optical axis. A. Hund and R. B. Wright. BS J. Research 4, 383-394 (1930). Also published in Proc.I.R.E. 18, 741-761 (1930).	RP156	OP
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Piezoelectric Frequency Standards - Continued
(R214)

Title	Series	Price
Quartz plate mountings and temperature control for piezo oscillators. V.E. Heaton and E.G. Lapham. BS J. Research 7, 683-690 (1931). Also published in Proc.I.R.E. 20, 261-271 (1932).	RP366	OP
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Resistance of conductors of various types and sizes as windings of single-layer coils at 150 to 6000 kilocycles. E. L. Hall. Tech. Pap. BS 21, 109-119 (1926).	T330	OP

Measurements at radio frequency (a differential transformer method). A Hund. Elec. World 84, 998-1000 (1924).

The use of the electron tube peak voltmeter for the measurement of modulation. C. B. Jolliffe. J. Optical Soc. Am. and Rev. Sci. Inst. 9, 701-704 (1924). Proc.I.R.E. 17, 660-663 (1929).

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Title	Series	Price
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A continuous recorder of radio field intensities. K. A. Norton and S. E. Reymer. BS J. Research 11, 373-378 (1933).	RP597	OP
On the accuracy of radio field-intensity measurement at broadcast frequencies. H. Diamond, K. A. Norton and E. G. Lapham. J. Research NBS 21, 795-818 (1938).	RP1156	OP
A method of measuring radio field intensities and atmospheric disturbances. L. W. Austin and E. B. Judson. Proc. I.R.E. 12, 521-532 (1924).		
An automatic recorder for measuring the strength of radio signals and atmospheric disturbances, E. B. Judson. Proc. I.R.E. 16, 666-670 (1928).		
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Title	Series	Price
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Radio and safety. C. B. Jolliffe. Supplement, Annals of the American Academy of Political and Social Science 142, 67 (1929).		

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Unicontrol radio receiver for ultra high frequencies using concentric lines as interstage couplers. F. W. Dunmore. J. Research NBS 15, 609-618 (1935). Also published in QST 20, 21-23 of Feb. (1936).	RP856	OP

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(R363)

Title	Series	Price
A method of studying electrode potentials and polarization. (Use of electron tube amplifier). H. D. Holler. Sci.Pap.BS 20, 153-166 (1925).		
Notes on aperiodic amplification and applications to the study of atmospherics. A. Hund. Proc.I.R.E. 16, 1077-1078 (1928).		
Note on radio-frequency transformer theory. H. Diamond and E.Z. Stowell. Proc.I.R.E. 16, 1194-1202 (1928).		

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Note on telephone receiver impedance. E. Z. Stowell. Proc.I.R.E. 13, 245-249 (1925).		

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(R382)

Radio-frequency resistance and inductance of coils used in broadcast reception. A. Hund and H.B. DeGroot. Tech.Pap.BS 19, 651-668 (1925).	T298	OP

Direction Finder Systems and Equipment
(R501.1)

The radio direction finder and its application to navigation. F. A. Kolster and F. W. Dunmore. Sci.Pap. BS 17, 539-566 (1922).	S428	OP
A unicontrol high-frequency radio direction finder. F.W. Dunmore. Sci.Pap. BS 21, 25-35 (1926).	S525	OP
A portable radio direction finder for 90 to 7700 kilocycles. F. W. Dunmore. Sci.Pap.BS 21, 409-430 (1926).	S536	OP

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(R520)

A directive type of radio beacon and its application to navigation. F.H. Engel and F.W. Dunmore. Sci. Pap.BS 19, 281-295 (1924).	S480	OP

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(R520)

Title	Series	Price
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(R525)

Title	Series	Price
Characteristics of airplane antennas for radio range-beacon reception. H. Diamond and G.L. Davies. BS J. Research 6, 901-916 (1931). Also published in Proc.I.R.E. 20, 346-358 (1932).	RP313	OP

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(R526.1. See also R520)

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Design of tuned reed course indicators for aircraft radio beacon. F.W. Dunmore. BS J. Research 1, 751-769 (1928).	RP28	OP
Unidirectional radiobeacon for aircraft. E.Z. Stowell. BS J. Research 1, 1011-1022 (1928).	RP35	OP
A course shift indicator for the double modulation type radio beacon. H. Diamond and F.W.Dunmore. BS J. Research 3, 1-10 (1929).	RP77	OP
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A 12-course radio range for guiding aircraft with tuned reed visual indication. H. Diamond and F.G. Kear. BS J. Research 4, 341-369 (1930). Also published in Proc.I.R.E. 18, 939-962 (1930).	RP154	OP
Applying the radio range to the airways. F.G.Kear and W.E. Jackson. BS J. Research 4, 371-381 (1930). Also published in Proc.I.R.E. 17, 2268-2282 (1929).	RP155	OP
Development of the visual type airway radio beacon system. J.H. Dellinger, H. Diamond, and F.W. Dunmore. BS J. Research 4, 425-459 (1930). Also published in Proc.I.R.E. 18, 796-839 (1930).	RP159	OP

Beacon Systems for Aircraft - cont'd.
(R526.1. See also R520)

Title	Series	Price
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A course indicator of pointer type for the visual radio range-beacon system. F.W. Dunmore, BS J. Research 7, 147-170 (1931). Also published in Proc. I.R.E. 19, 1579-1605 (1931).	RP336	OP
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Phase synchronization in directive antenna arrays with particular application to the radio range beacon. F. G. Kear. BS J. Research 11, 123-139 (1933).	RP581	OP
A method of providing course and quadrant identification with the radio range-beacon system. F. W. Dunmore. BS J. Research 11, 309-325 (1933).	RP593	OP
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Field intensity characteristics of double-modulation type directive radio beacon. H. Pratt. Proc. I.R.E. 17, 873-878 (1929).		
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Title	Series	Price
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Performance tests of radio system of landing aids. H. Diamond. BS J. Research 11, 463-490 (1933)	RP602	OP
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A radio direction finder for use on aircraft. W. S. Hinman, Jr. BS J. Research 11, 733-741 (1933).	RP621	OP

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A method for the investigation of upper-air phenomena and its application to radio meteorography. H. Diamond, W.S. Hinman, Jr., and F.W. Dunmore. J. Research NBS 20, 369-392 (1938). Also published in Proc. I.R.E. 26, 1235-1265 (1938).	RP1082	OP
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Radiometeorographs (radiosondes) - cont'd
(R553.1)

Title	Series	Price
Electrolytic resistors for direct-current applications in measuring temperatures. D.N. Craig. J. Research NBS 21, 225-233 (1938).	RP1126	10c
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An improved electric hygrometer. F. W. Dunmore. J. Research NBS 23, 701-714 (1939). Also published in Bul. Amer. Met. Soc. 21, 249-256 (1940).	RP1265	5c
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(R553.1)

Title	Series	Price

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Analysis of broadcasting station allocation. J. H. Dellinger. Proc. I.R.E. 16, 1477-1485 (1928).

Note on the synchronization of broadcast stations WJZ and WBAL. K. A. Norton. Proc. I.R.E. 22, 1087-1089 (1934).

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(R555)

Development of standard frequency transmitting sets. L. Mickey and A. D. Martin, Jr. BS J. Research 12, 1-12 (1934). — RP630 — OP

Monitoring the standard radio frequency emissions. F. G. Lapham. J. Research NBS 14, 227-238 (1935). — RP766 — OP

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(R555)

Title	Series	Price

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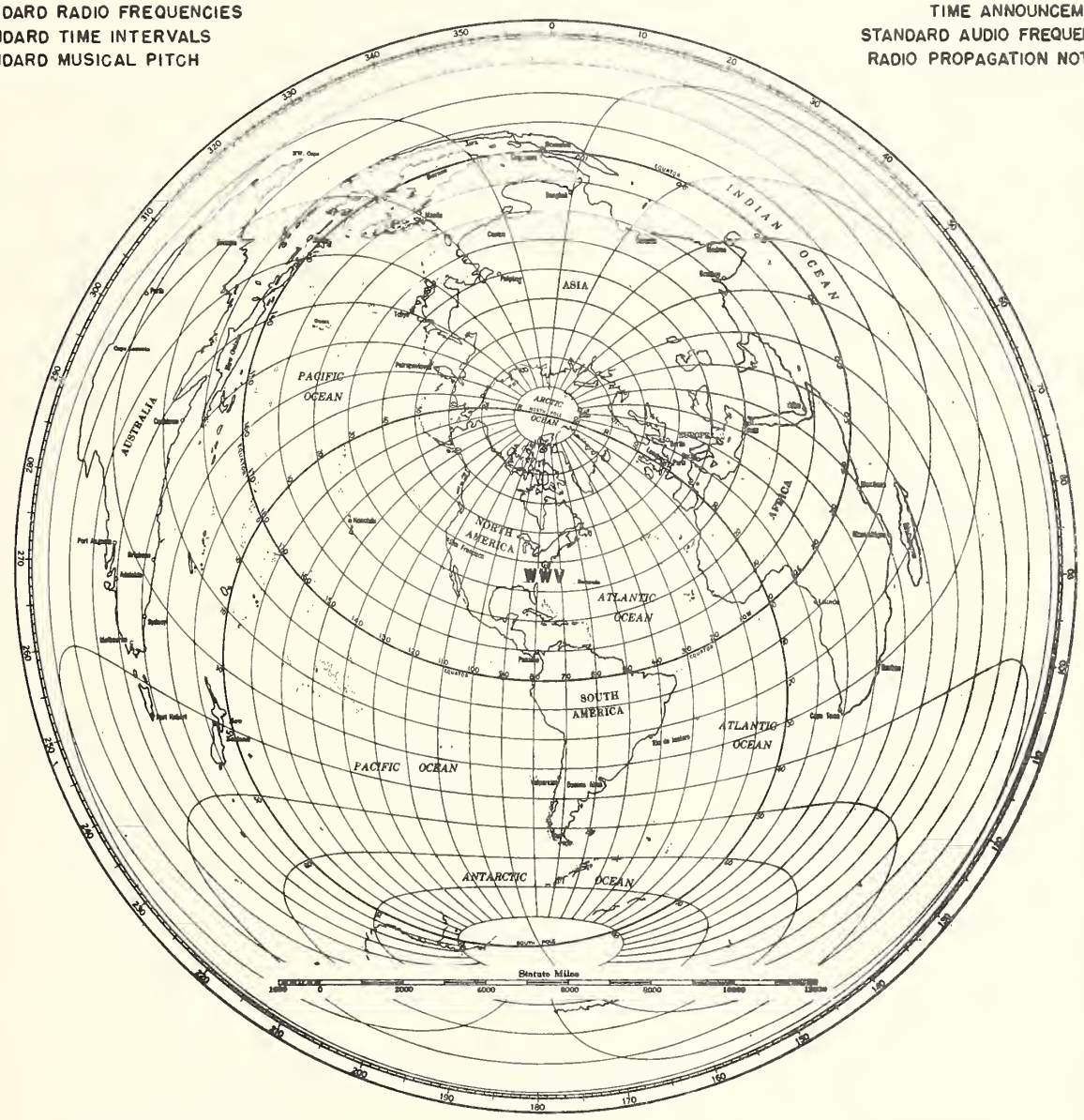
AUGUST 26, 1947

U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
CENTRAL RADIO PROPAGATION LABORATORY
WASHINGTON, D. C.

TECHNICAL RADIO BROADCAST SERVICES

STANDARD RADIO FREQUENCIES
STANDARD TIME INTERVALS
STANDARD MUSICAL PITCH

TIME ANNOUNCEMENTS
STANDARD AUDIO FREQUENCIES
RADIO PROPAGATION NOTICES



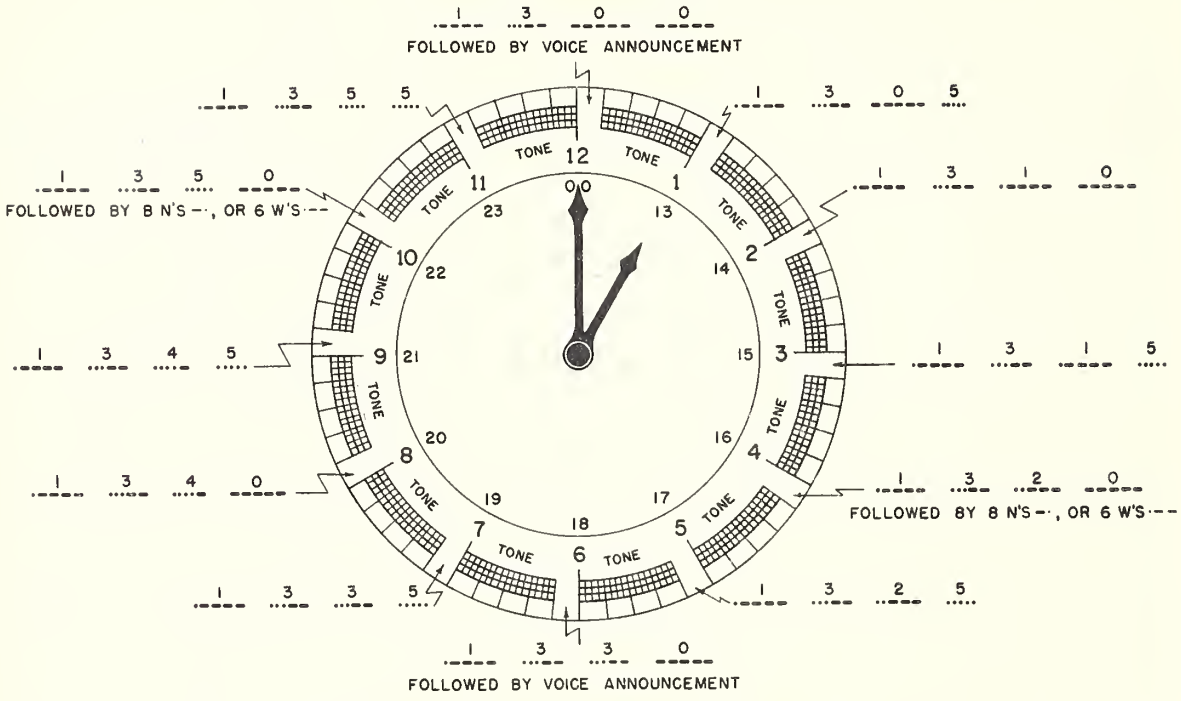
MEGACYCLES	BROADCAST, E.S.T.	POWER, KW	MODULATION, C/S
2.5	7:00 PM TO 9:00 AM	0.7	1 AND 440
5	7:00 PM TO 7:00 AM	8.0	1 AND 440
5	7:00 AM TO 7:00 PM	8.0	1, 440 AND 4000
10	CONTINUOUSLY	9.0	1, 440 AND 4000
15	CONTINUOUSLY	9.0	1, 440 AND 4000
20	CONTINUOUSLY	8.5*	1, 440 AND 4000
25	CONTINUOUSLY	0.1	1, 440 AND 4000
30	CONTINUOUSLY	0.1	1 AND 440
35	CONTINUOUSLY	0.1	1

* 0.1 KW. FOR FIRST 4 WORK DAYS AFTER 1st SUNDAY OF EACH MONTH

STATION WWV TIME ANNOUNCEMENTS

THE HOUR ILLUSTRATED IS 1 TO 2 PM, OR 1300 TO 1400 IN 24 HOUR TIME

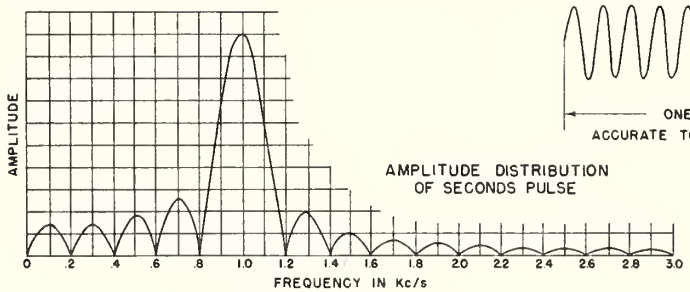
EASTERN STANDARD TIME

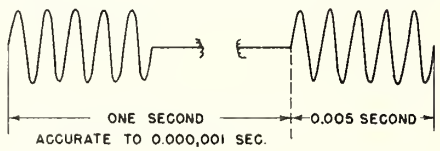


NUMERALS IN INTERNATIONAL MORSE CODE

0 -----	2 ··---	4 ····-	6 -····	8 ---··
1 ·----	3 ···--	5 ·····	7 --···	9 ----·

SECONDS PULSE (NO PULSE IS TRANSMITTED AT THE BEGINNING OF THE 59 th SECOND OF EACH MINUTE)





WWV TIME SIGNALS, DEVIATIONS FROM U.S. NAVAL OBSERVATORY TIME JANUARY TO JUNE 1947